

Serial No.: 10/779,558
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Amendment Date: 7/5/2007

II. AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in this Application:

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Listing of Claims:

1. (currently amended) Method for controlling a mode to mode shift ~~from a first mode to a second mode~~ in a multi-mode, electro-mechanical transmission including an input member and an output member, first and second torque transfer devices, at least one motor, first mode operation characterized by simultaneous first torque transfer device applied and second torque transfer device released wherein the transmission input member is mechanically coupled to the transmission output member through a continuously variable ratio, second mode operation characterized by simultaneous first torque transfer device released and second torque transfer device applied wherein the transmission input member is mechanically coupled to the transmission output member through a continuously variable ratio, neutral ~~mode~~ operation characterized by simultaneous first and second torque transfer devices released wherein the transmission output member is mechanically decoupled from the transmission, and fixed-ratio operation characterized by simultaneous first and second torque transfer devices applied wherein the transmission input member is mechanically coupled to the transmission output member through a fixed ratio, comprising:
while in one of the first and second modes, releasing the one of the first and second torque transfer devices that is applied to establish neutral mode operation;
controlling slip speed across one of the first and second torque transfer devices to substantially zero; and,

Serial No.: 10/779,558
Filing Date.: 2/14/2004

Office Action Date: 4/5/2007
Amendment Date: 7/5/2007

applying the one of the first and second torque transfer devices across which slip is being controlled when the slip thereacross is substantially zero.

2. (original) The method for controlling a shift as claimed in claim 1 wherein controlling slip speed across the one of the first and second torque transfer devices is accomplished by adjusting motor torque.

3. (original) The method for controlling a shift as claimed in claim 2 wherein controlling slip speed terminates when the one of the first and second torque transfer devices across which slip is being controlled is fully applied.

4. (original) The method for controlling a shift as claimed in claim 1 further comprising:
establishing a substantially zero torque at the output member immediately in advance of releasing the one of the first and second torque transfer devices.

5. (original) The method for controlling a shift as claimed in claim 4 further comprising:
establishing a substantially non-zero torque at the output member immediately subsequent to the application of the one of the first and second torque transfer devices.

6. (original) The method for controlling a shift as claimed in claim 1 wherein the shift is initiated in response to a ratio violation.

Serial No.: 10/779,558
Filing Date.: 2/14/2004

Office Action Date: 4/5/2007
Amendment Date: 7/5/2007

7. (original) The method for controlling a shift as claimed in claim 1 wherein the shift is initiated in response to a rate of change of output member speed in excess of a predetermined amount.

8. (currently amended) Method for controlling a mode to mode shift ~~from a first mode to a second mode~~ in a multi-mode, electro-mechanical transmission including an input member and an output member, first and second torque transfer devices, at least one motor, first mode operation characterized by simultaneous first torque transfer device applied and second torque transfer device released wherein the transmission input member is mechanically coupled to the transmission output member through a continuously variable ratio, second mode operation characterized by simultaneous first torque transfer device released and second torque transfer device applied wherein the transmission input member is mechanically coupled to the transmission output member through a continuously variable ratio, neutral ~~mode~~ operation characterized by simultaneous first and second torque transfer devices released wherein the transmission output member is mechanically decoupled from the transmission, fixed-ratio operation characterized by simultaneous first and second torque transfer devices applied wherein the transmission input member is mechanically coupled to the transmission output member through a fixed ratio, and a preferred operating region for first mode operation on one side of the fixed ratio and a preferred operating region for the second mode of operation on the other side of the fixed ratio, comprising:
when one of the first and second modes of operation is active within the preferred operating region for the other of the first and second modes of operation, executing a shift through the neutral ~~mode~~ operation comprising;

Serial No.: 10/779,558
Filing Date.: 2/14/2004

Office Action Date: 4/5/2007
Amendment Date: 7/5/2007

reducing output member torque to substantially zero,
releasing the one of the first and second torque transfer devices that is applied,
determining which of the first and second modes is desired,
controlling to substantially zero the slip speed across the one of the first and second
torque transfer devices which when applied establishes the desired one of the
first and second modes,
applying the one of the first and second torque transfer devices that will establish the
desired one of the first and second modes, and
increasing output member torque to non-zero.

9. (original) The method as claimed in claim 8 wherein reducing output torque to substantially zero includes ramping output torque at a predetermined rate.

10. (original) The method for controlling a shift as claimed in claim 8 wherein controlling slip speed is accomplished by adjusting motor torque.

11. (currently amended) Method for controlling a mode to mode shift ~~from a first mode to a second mode~~ in a multi-mode, electro-mechanical transmission including an input member and an output member, first and second torque transfer devices, at least one motor, first mode operation characterized by simultaneous first torque transfer device applied and second torque transfer device released wherein the transmission input member is mechanically coupled to the transmission output member through a continuously variable ratio, second mode operation characterized by simultaneous first torque transfer device released and second torque transfer device applied wherein the transmission input member is

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Filing Date.: 2/14/2004

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mechanically coupled to the transmission output member through a continuously variable ratio, neutral ~~mode~~ operation characterized by simultaneous first and second torque transfer devices released wherein the transmission output member is mechanically decoupled from the transmission, fixed-ratio operation characterized by simultaneous first and second torque transfer devices applied wherein the transmission input member is mechanically coupled to the transmission output member through a fixed ratio, and a preferred operating region for first mode operation on one side of the fixed ratio and a preferred operating region for the second mode of operation on the other side of the fixed ratio, comprising:

when the first mode of operation is active within the preferred operating region therefor and the output member experiences a rate of change of speed in excess of a preset threshold, executing a shift through the neutral ~~mode~~ operation comprising;

releasing the first torque transfer device,

controlling slip speed across the second torque transfer devices to substantially zero,

and

applying the second torque transfer device when the slip speed of the torque transfer device is substantially zero.

12. (original) The method for controlling a shift as claimed in claim 11 wherein controlling slip speed across the second torque transfer device is accomplished by adjusting motor torque.